Gathered resources are found near the streams in marshy places where the moriche palm grows, and to a lesser extent in the savannas.[17] The dry season resources are also distributively located though the pattern is somewhat different. Quanta of production from these resources at any one time are rarely great. The larder, as it were, must be filled from a number of sources at once, even though one crop, particularly bitter manioc, and occasionally sweet manioc and corn, may rise briefly to as much as 50 or 60% of the food supply. Thus the available quanta of resources and their distribution at given moments in time are such as to demand a distributive form of labor organization: workers, as individuals or in very small groups, must go off in different directions at the same time. The obverse of this, of course, is that no sizable or permanent working groups are to be expected and none in fact occur. Further, because a dispersion of the labor force and a constant flux in the constitution of work groups is entailed by the relationships between the technology and the habitat, organized and permanent managerial functions can scarcely occur, and no fixed status with significant managerial powers would be expected. The observed data of leadership among the Yaruro and many other tribes in South America and other parts of the world, such as Melanesia, having fundamentally similar ecologies, corresponds precisely with what one is led to expect logically from the form of the ecology.

The absolute size of work groups achievable in the Yaruro habitat is limited not only by the dispersed locations and temporal harvest patterns of resources, but also by the absolute productivity of the ecology. If one calculates the distribution per land area of those calories potentially convertible to human energy, the rate of calories per unit of land surface is so low that even at maximum utilization only a very low population density of about 2 persons per square mile would be possible. If concentrated in the center of an effective walking distance for exploiting resources of, say, six miles radius from a village, with a resultant total area of about 110 square miles, there would be about 220 souls. Of these, perhaps 70% (all persons over age 10), at maximum, might constitute the labor force, i. e. 154 adults and older children. The actual conditions are, of course, much more limiting, since the efficiency of the technology is such that it cannot exploit the totality of calories potentially available for conversion to human energy at any one time.[19] The actually harvested calories are considerably less, though I have no estimates as to how much less. Let us estimate half, or enough to support one person per square mile, that is, 110 persons. With a somewhat smaller per cent of the population available for the labor force, say 60% of the 110, the force would have only about 67 persons at most. This appears to be a reasonable number for the Cinaruco Yaruro groups, although due to depopulation from disease and mas-

[17] *Ibid.*, Map I.

[18] *Ibid.*, Map II.

[19] For example, all the fish available in the streams at a given time cannot be caught. More could be caught with an improved technology, such as the use of fish traps, weirs, or fish poisons, which, as we have said, are absent from the technology of the Cinaruco Yaruro. Density of fish, or any other biotic population, can be estimated (cf. Dice, 1952, Ch. IV), and then compared with rates of harvesting. Furthermore, it should be noted that often the totality of an actually harvested resource may not be available. For example, in

46 433 sacre, the labor force actually observed in "my" group was a little more than 25% of that number, or 18, and neighboring groups were generally still smaller. These 154, 67, and especially the actual 18 workers, even if, at any given moment, *all* were working at subsistence activities, would be distributed over various parts of the 110 square miles of territory under the kind of dispersive habitat and technological conditions described. They are in fact so thinly scattered as to preclude any sort of continuing managerial functions.

V

241 433 A consideration of the forms of the harvest surplus[49] is relevant to our discussion. Harvest surpluses must be considered with respect both to individual subsistence resources and to all subsistence resources taken together. In the annual cycle, there is considerable variation in the amount produced of any given crop, except for sweet and bitter manioc which together constitute perhaps 40% of the annual food supply of the Yaruro. Manioc produces throughout the year. Given that the manioc-growing areas are widely dispersed and that considerable labor is drawn from manioc areas by still more dispersed resources, it follows that most work units for manioc gardens will consist of only one or two men, each having their own swidden or sharing it with one or two others to supply themselves and their immediate families throughout the year. As might be expected, land tenure and land usage patterns are in accord with this inference. Occasionally small oscillations in the manioc crops may produce small harvest surpluses. These, at least nominally, belong to the man in whose swidden they grow and are his for disposal. The quantities, however, are exceedingly small, and present no problems of storage or disposal necessitating more centralized supervision and allocation. Most other resources display a similar pattern though to an even smaller degree. 262 Fish are obtainable, for the Cinaruco Yaruro, all year round with almost equal ease, though the Palmariteños have a more difficult time because of the grassy and muddy waters in the rainy season. Hunting windfalls and large pigs are the only animal sources which present harvest surpluses of any size. However, these are small enough so that they last at most two or three days, and they are so irregular both as to occurrence and as to personnel involved that no regular centralized [251] institutional mode of handling them is entailed. The virtual absence of meat storage

For example, in [171] the Trobriand Islands, in a good year, all the yams harvested cannot be eaten at once, nor can they be stored. Some portion of the crop is then lost by spoilage. We may construct, in terms of calories or other significant food values, two ratios:

[146 464] $\frac{C_h}{C_p}$ $\frac{C_c}{C_h}$

C — Calories
c — consumed
p — potential
h — harvested (= available for use)

The first may be used as a measure of the efficiency of the productive capacity of the technology; the second as a measure of the efficiency of the distributive capacity of the technology.

[49] The technological, producers, and harvest surpluses are defined in Harris, 1956, [114] and implied in Harris, 1959. They are dealt with in detail with respect to the Yaruro in Leeds, 1961. Other relevant discussions of surplus are found Sahlins, 1958; Jacobs and Stern, 1952, Ch VI.

also inhibits any such development because it forces the immediate distribution of most of the meat of the slaughtered pig or captured game. There is no constantly or repeatedly stored supply to be supervised or allocated. In fact swine and windfall game, properly considered, correspond to the small oscillations of the manioc supply and are totally different from the regularly occurring massive incidence of food sources like buffalo herds, salmon runs, and wheat harvests of temperate climates or crab runs in the tropical Orinoco delta of Venezuela.[21]. Of all the food resources, the only one with a marked harvest surplus is corn. The significance of even this harvest surplus is reduced by a) the smallness of the quanta involved relative to the total food supply, and b) the fact that there are two corn seasons, one beginning in June, one about the beginning of February. Temporary harvest surpluses of corn may, however, contribute slightly to the enhanced prestige of those individuals who by their own will and work have been most productive.[22] They say with appreciation, "He is a hard worker", but the prestige is relevant only to the sphere in which it is gained. It does not necessarily give him prestige in some other spheres of cultural life, such as, for example, the ceremonial or decision-making activities.

In taking an overall view of the food resources, it will be noted that there are no clear harvest surpluses, and that the oscillations in supply, which are in truth minute and momentary harvest surpluses, are so small and irregular and varied in location as to be insignificant determiners of managerial functions. At most one might expect the harvest surplus of corn to elicit some small allocative function, generally none. Storage, too, in this case, is not a technique requiring administration as with wheat in grain elevators. It would in fact be better to consider this kind of storage as a steady presence of food rather than as storage at all, even though it functions as such.

The extra labor requirements of these small upward oscillations of the harvest surplus are likewise, in general, indistinguishable from regular labor requirements and are easily absorbed by individual workers. Or a worker may take along a child, who goes as much for the fun of being with his father or grandfather, but nevertheless carries back some produce. This type of situation is in sharp contrast with, say, the labor requirements of a large harvest surplus like the wheat crop in the United States which demands a large amount of labor quickly and temporarily. Such a harvest surplus entails a number of organizational problems foreign to the harvest oscillations.

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[21] Personal communication from Johannes Wilbert who has done extensive fieldwork with the Warrau in the Amacuro Delta of the Orinoco River.

[22] Yaruro individuals differ in productivity not only because of inborn qualities such as strength and native abilities, but also by choice based on tastes. Some do not like to grow corn, others do not like to grow pigs, others still prefer to hunt or trade. The food quanta produced by these several activities vary greatly. The individual may exercise these choices in a cultural setting where any such choice benefits the community. All produce eventually finds its way into the community at large through the distribution mechanism. The person is not acting as an individualist regardless of the interest of others, but at his own optimum, given his unique person, in the community as a whole. Cf Fn 5 *supra*.

/117 cont./

342 may also be used, but rarely, throughout the year (communities
361 25, 26, and 28).

The type I house is a house that lasts for several years, whereas the small huts (II) and the shelters of boughs (III), either dismantled by the wind or carried off by the rising water in each new rainy season, must almost always be reconstructed the following year.

The winter habitations of a community are always grouped (the dispersion of those of communities 4 and 10 is provisional), whereas the huts and camping shelters of the seasonal changes and of the dry season are sometimes dispersed (one, two, or three huts) on shores located around the winter village.

[396
464] In addition, if the Yaruro spend the entire rainy season in the same place and lead a sedentary life at this time, during the dry season and even during the transition period between the two seasons, they move their encampments from one place to another on the same shore or from one shore to another, with the intention of either drawing nearer to water or of reinstalling themselves on sand which is clean and not encumbered with refuse, or in order to be closer to a hunting, fishing, or work place (construction of a monosylic canoe or employment on a Venezuelan farm at dry season jobs).

Let us add in conclusion that on the Capanaparo, between the Orinoco and the Riecito, all the permanent winter habitations with one or two exceptions are located, or were, in the case of the lower Capanaparo, on the southern bank. The cause of this situation seems to be the configuration of the terrain: the southern bank at this place is in general more elevated than the northern bank and hence better shielded from floods.

/9 cont./

productive and the Yaruro are living mainly on sandy shores, leading the life of fishers and nomadic gatherers--and limited them to the lower Capanaparo. There these Indians do not work the land, or at least very little; apparently for reasons linked with the proximity of Venezuelan peasants, such as: interdiction on the part of the latter who, with or without title, are masters of the land, the risk of being overrun by the free-roaming livestock, or simply work as peons on the farms, which would hardly allow them time to cultivate the land.

In fact, agriculture is only practiced on certain portions of their territory and particularly on those where they do not have contact with the Venezuelan peasants. This statement excludes at first sight the recent acquisition of it from the latter. Such a deduction is moreover corroborated by the accounts of the Jesuits (7) who lived for a while in the region in the eigh-

7. See "infra" IV List...2.

teenth century and who already described them as agriculturists--without specifying whether they had been before their arrival--and by the present Yaruro themselves, who affirm that they all formerly had conucos (8). But these points still do not

8. Kitchen gardens, in Venezuelan.

allow us to assert that they were in possession of the technique in the pre-Hispanic period.

2) The region, on the other hand, is rich in archaeological sites containing objects (pottery remains, figurines of baked clay and lignite, polished stone axes, funeral urns) which are of a completely different make from those made by the present-day Yaruro, who, moreover, do not recognize them as being of their making. Is it a question of remains of objects of forerunners or remains of objects of the Otomaco, who at the time of the Jesuits apparently lived in the present-day territory